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CARNEGIE Magazine

THE MAN WITH THE GOLDEN HELMET

February 1949

25 cents

"Episodes in Our Pennsylvania Heritage"
PITTSBURGH

"My intention is to give a subject . . . all the consideration which I possibly can before I speak fully and definitely in regard to it—so that, when I do speak, I may be as nearly right as possible." Abraham Lincoln at the Monongahela House, Pittsburgh, in 1861.

☆

Being "as nearly right as possible" is all that any one can ask. It results from the intelligent consideration of all ascertainable facts regarding a problem—a process by which *knowledge* is distinguished from *mere opinion* or *notion.*

In our administration of estates we hold no complacent or presumptuous attitude toward investment problems. Our efforts every business day are directed toward trying conscientiously to "be as nearly right as possible" in the application of sound investment policies to the accounts entrusted to our care.

MELLON NATIONAL BANK
AND TRUST COMPANY
PITTSBURGH

Calendar of Events

CARNEGIE INSTITUTE

4400 Forbes Street, Pittsburgh 13, Pennsylvania
Mondays 10:00 A.M. to 10:00 P.M.
Other weekdays 10:00 A.M. to 5:00 P.M.
Sundays 2:00 to 6:00 P.M.
Cafeteria open for visitors to the building
Weekdays 12:15 P.M. to 1:30 P.M., Mondays 6:00 to 8:00 P.M.
Fine Arts Galleries open until 10:00 P.M. weekdays through March 14

CARNEGIE LIBRARY OF PITTSBURGH

Weekdays 9:00 A.M. to 9:00 P.M.
Reference services until 10:00 P.M. weekdays
Sundays 2:00 to 6:00 P.M., reference services only

Open to the public every day without charge

MASTERPIECES FROM THE BERLIN MUSEUMS

Paintings that were the proud possession of the Kaiser Friedrich Museum and the Nationalgalerie in Berlin, found hidden during the War in the Merkers salt mines, are being shown at the Institute under sponsorship of the Department of the Army from February 27 through March 14. Among the more than ninety paintings is the work of Rembrandt, Titian, Botticelli, Franz Hals, Rubens, Watteau, and Tintoretto. There will be a preview for members of the Carnegie Institute Society on Saturday, February 26, from eight to eleven o'clock. A reading list has been issued by the Carnegie Library, and various catalogues and reproductions will be on sale. An admission of 25c will be charged, for the benefit of German children in the American Sector.

TALKS ON THE "MASTERPIECES"

A number of free illustrated lectures will be given on the paintings from Berlin museums preceding and during the period they are on exhibit.

Walter Read Hovey, head of the department of fine arts at the University of Pittsburgh, will speak three Friday afternoons at 2:30 o'clock in the Lecture Hall, February 11, 18, and 25, covering particular phases of the show. These talks are sponsored by the National Council of Jewish Women, and the public is invited.

Mr. Hovey will also give illustrated lectures on the exhibit, three Sundays at 2:30 P.M., in the Lecture Hall: "Dutch and Flemish School" on February 27; "Italian School" on March 6; and "French and Related Schools" on March 13.

In addition, each weekday during the showing there will be illustrated talks at 10:30 A.M. and 7:30 P.M., in the Dalzell Gallery, third floor of the Institute.

ASSOCIATED ARTISTS

The work of artists of this section is being shown in the third-floor galleries through March 10. This thirty-ninth annual exhibition of the Associated Artists of Pittsburgh presents 151 oils, 56 water colors, 20 black and whites, 21 pieces of sculpture, and 83 crafts articles. The work on display was selected from 1,011 entries by a jury composed of George Grosz, Joe Jones, Morris Kantor, Alexander Archipenko, and Victor Schrekengost.

JADES AND CRYSTALS

Jades from China, New Zealand, and Costa Rica, ranging in color from the semitransparent green of imperial and apple green jade, through yellow, mauve, white, to black, are on display out of the Museum collections; also Chinese carved crystal, European cut crystal, and rock crystal. The effect of the exhibit is

(*Over*)

THE MAN WITH THE GOLDEN HELMET

Rembrandt, whose famous painting is one from the Berlin museums that will go on exhibit at the Institute from February 27 through March 14, was a great collector of art treasures and costumes, in addition to being painter and etcher. Frequently he dressed his models in exotic accessories quite different from their daily attire. This portrait of his brother Adriaen, in which the helmet is the focus of interest, demonstrates Rembrandt's talent for building form with light. It was painted about 1650 and acquired in London by the Kaiser Friedrich Museums Verein in 1897. The canvas is a little more than two feet high.

BEQUESTS—In making a will, money left to Carnegie Institute, Carnegie Institute of Technology, or Carnegie Library of Pittsburgh should be covered by the following phrase: I do hereby give and bequeath to (Carnegie Institute) or (Carnegie Institute of Technology) or (Carnegie Library of Pittsburgh) in the City of Pittsburgh, Pennsylvania.....Dollars

CARNEGIE MAGAZINE dedicated to literature, science, and art is published monthly (except August and September) at 4400 Forbes Street, Pittsburgh 13, Pennsylvania, by Carnegie Institute, Carnegie Library, and Carnegie Institute of Technology. James M. Bovard, editor; Jeannette F. Seneff, editorial assistant; Florence A. Kemler, advertising manager. Telephone Mayflower 7300. Volume XXII, Number 7. Permission to reprint articles will be granted on request. Copies regularly sent to members of Carnegie Institute Society. Subscription $2.00 a year. Single copies 25 cents.

enhanced by dramatic mirror and lighting effects and by three large murals showing Count de Cagliostro crystal gazing, an Aztec human sacrifice, and an ancient Chinese empress in her court—these the work of Robert R. Young.

GEORGIAN SILVER

The Eleanore E. Stoney and Mary L. Edwards collection of 137 pieces of eighteenth-century Georgian silver recently arrived from England and presented to the Museum by Mary L. Edwards, is now on display in Exhibit Room 5. This includes a large coffee urn, salt and pepper shakers, sugar and cream sets, cruets, spoons, knives, and forks. Silversmiths represented are John Lloyd, John Carter, Robert Breading, and William Scarlett.

ILLUSTRATED LECTURES

Monday nights in Music Hall, 8:30 o'clock
Seats reserved until 8:30 P.M.
for members of Carnegie Institute Society,
after which general public is admitted

THE STORY OF THE ORGAN—*February 14*
Marshall Bidwell

The evolution of the organ as a musical instrument will be shown in colored slides, and the wide ranges of tone in the famous Music Hall organ will be demonstrated in a lecture-recital by Dr. Bidwell, organist and director of music at the Carnegie Institute Music Hall.

BANANA COUNTRY—*February 21*
Arthur C. Twomey

The premiere showing of colored motion pictures taken by Dr. Twomey last summer while sailing the Caribbean and collecting birds in the jungles of Spanish Honduras—a colorful story in pictures of the exotic flora and fauna of the tropics.

THE LAST SAIL—*February 28*
Alan Villiers

The great white-winged sailing ships are shown in color movies taken by Mr. Villiers last summer when he sailed in the Great Cape Horners of the Grain Race.

HOLIDAY IN FRANCE—*March 7*
Robert Friars

The country of beautiful memories—leaving war and politics unmentioned—will be shown by Mr. Friars, lecturer and globe-trotter, in probably the first color travelogue ever to show France through the four seasons.

FILMS OF YESTERYEAR

SATURDAYS AT 8:00 P.M., MUSIC HALL
(Admission charged)
Season tickets now on sale

SUNDAYS AT 8:00 P.M., MUSIC HALL
Seats reserved until 7:50 P.M.
for Carnegie Institute Society members,
then open to the public without admission charge

HUNCHBACK OF NOTRE DAME—*February 19, 20*

FIVE MACK SENNETT COMEDIES—*February 26, 27*

BEN HUR—*March 5, 6*

ORGAN RECITALS

MUSIC HALL
MARSHALL BIDWELL, ORGANIST AND DIRECTOR
Sundays at 4:00 P.M.

FACULTY RECITAL SERIES

LITTLE THEATRE, 8:30 P.M.
Maria Malpi, soprano—*February 27*
Tickets may be obtained from Carnegie Tech

FINE PRINTS

Kenneth Seaver's recent gift to the Institute of more than one hundred fine prints by such artists as Dürer, Mantegna, Rembrandt, Piranesi, Goya, Whistler, Pennell, Zorn, Blampied, will continue on the balcony of the Hall of Sculpture through March 27.

WOODCUTS BY BOYD HANNA

Woodcuts by this Pittsburgh artist illustrating *The Compleat Angler* (Peter Pauper Press) will be on display during March at the Library. The book was selected by the American Institute of Graphic Arts as one of the fifty notable books of 1947 for typographical excellence. A number of Mr. Hanna's wood blocks and engraving tools will also be shown.

MASKS OF THE WORLD

Continues through March 6.

SEA BOTTOM TO MOUNTAIN TOP

Continues indefinitely.

STORY HOUR

BOYS AND GIRLS ROOM OF THE LIBRARY
Over five years old—Saturdays at 10:30 A.M.
Three to five—Alternate Wednesdays at 10:30 A.M.
(February 16, March 2)
Library staff members talk informally with the mothers about various phases of Library service during the Wednesday story hour.
On the radio—WCAE at 1:15 P.M.
Every Monday and Wednesday

MOVIES FOR CHILDREN

SATURDAYS AT 2:15 P.M.
LECTURE HALL

OPEN MEETINGS

IN CARNEGIE INSTITUTE BUILDING
Guild of Artists—6:45 P.M., Mondays
Guild of Naturalists—6:45 P.M., Mondays
Glass Club—8:00 P.M., *February 15*
"It Might Happen to You"—Dr. and Mrs. H. J. Neelley giving an illustrated talk
Audubon Society—8:00 P.M., *February 23*
"Do Birds Converse?" Robert Ford will play his records of bird songs.
Numismatic Society—8:00 P.M., *March 1*
Explorers Club—8:15 P.M., *March 8*
Botanical Society—8:15 P.M., *March 9*
"Plants under the Microscope"—K. L. McDowell and A. S. Heilman

BROADCASTS

TUESDAYS AT 6:45 P.M., FROM WCAE

THE PROBLEM OF EXPRESSION IN ART

By Balcomb Greene

BALCOMB GREENE

Despite the belief which the amateur sometimes holds, creative activity is not "fun." As a serious occupation it demands a painful intensity, often bitter disappointment, and even an exultation which is anything but relaxing.

The intensity of the process is heightened when one rejects easy formulas invented by other people, when he knows that his new expression will for a long time be offensive to many, and when he is obliged to recall that fame and financial reward usually do not quickly follow originality.

We understand how the artist when faced by the flesh-and-blood public will often seek a contact which is pleasant. John Doe, a genial man with a large earnestness and even shades of humility, will inquire of the painter: "I've seen quite a few of these abstracts. Sometimes I like the color but usually I don't get them. I want to learn to like them, I really do. I'm sure you can tell me what they mean."

Mr. Doe seems honest. Since he assumes you are articulate he has also flattered you. You are bound to be nice to him. His ignorance at this date really amazes you; you also faintly pity him. You are in a mood to be elementary, will not expect too much from him. If your work is semi-representational, that is, abstract, or completely non-representational, it seems wise to speak first of design and such elements as may be called the formal values. You explain that such values are (telling half a truth) irrelevant to representation. Thus for the sake of color, for design and for rhythm, you have simply distorted visual appearances.

Mr. Doe, like all men, at the showdown is pro-esthetic. Thus your idea impresses him, for a moment it does. He glances hungrily at your work, perhaps trying to get that "lovely" feeling. Seeing he is perplexed, you follow through quickly:

Your expression, of course, is personal. You say this confidently. You are sure that in the structure of this man's mind there is room for the personal concept. If he is a socialized thinker he will respect the expression of minority groups—which include you. If he is a rugged individualist he may presume you are one also.

If your man still looks puzzled, you may try to get away from a contact now difficult with an assurance that the work isn't hard to understand. You say this cheerfully. All one has to do is patiently look at it. It takes time, naturally. But the secret of liking is open to all. You have reduced yourself by this statement to a painter who is at least vocally inarticulate. You have implied, in your total attitude, a great deal more.

You have said you are mediocre.

If Mr. Doe is intuitive he will know you have said this.

The most lamentable possibility is that

Balcomb Greene took his bachelor's degree at the University of Syracuse in 1926, then studied psychology in Vienna for almost a year. His interest shifted to English and writing, and he was studying at Columbia University when called to Dartmouth College to become instructor in English from 1928 to 1931.

During the next ten years, in New York City and in Paris, he was painting, being influenced by the artists of his acquaintance, by his wife, who is a sculptor, and most strongly by a Polish artist, Stanislaw Grabowski, with whom he worked in Paris. He edited *Art Front* in 1933-34 and the *Abstract Artists Annual* in 1938, contributing articles to both magazines and also more recently to *Art Weekly*.

Mr. Greene took his master's degree in the history of art at New York University in 1941 and the next year came to Carnegie Tech as assistant professor of the history of art.

A number of his paintings are owned by leading galleries: the Museum of Modern Art, The Solomon Guggenheim Foundation, the Whitney Museum of American Art, and the Walker Art Center in Minneapolis.

A one-man showing of Mr. Greene's paintings, featuring him as "Man of the Year," has just closed at the Arts and Crafts Center.

you faced a competent man and fumbled your chance. In his own field he is courageous and intelligent; he also had the energy to understand yours.

* * *

The important paintings that are abstract or non-objective cannot be understood easily or by everyone. This we should expect. Our important philosophers, scientists, and social thinkers deal in concepts which we laboriously learn to follow. The average man will never see clearly the meaning in existentialism, the character of pure science, or the seemingly fine distinctions between present-day political ideologies. He doesn't even want to. His prejudices depend upon destructive simplifications.

BLACK ANGELS BY BALCOMB GREENE

In the case of painting let us investigate the reasons for this by a reference to modern expression. We may arbitrarily select three levels and themes of expression. By the selection and isolation our discussion becomes an artifice. We may deal with the element which we call rhythm, in a limited way with the human body as subject, and, lastly, with the relatively rare treatments in the modern period of the Christ theme:

(1) Rhythm in modern art tends to be drastic and almost never "lovely." Primarily under the impacts of aboriginal primitive sculpture and the modern world of machines, the rhythms are angular, sharp, and may impress one as harsh. The rhythms are at times repetitive, seeking deliberate monotony—a monotony against which may occur surprising changes. In the visual arts and in music the detail or the notes may seem incredibly fast and crowded, but again very slow, open, and empty. In Western painting generally for the last several centuries the development had been away from dynamic rhythm, and even away from rhythm which has value as expression.

Picasso is a good example of a painter who, like his friend Stravinsky, preferred angularity of rhythm. The Dutch painter Mondrian, who painted severely straight lines that form absolute rectangles, establishes extreme linear tensions. These tensions are almost like taut steel wires vibrating and are separated by finely calculated intervals. Among those who appreciate the rhythm in these two painters one is not apt to find many wishy-washy or pale personalities.

(2) In the last century a popular painter of the female nude was William Bouguereau. In his *Painting and Painters* Lionello Venturi analyzes Bouguereau's *Nymphs and Satyr*, a work one might term erotic and moralizing. Bouguereau was dishonest. In his painting he lies to us. He habitually tempts us with naked females in provocative postures, but proclaims his concern for ideal and edifying beauty.

When Picasso is erotic, he is not ashamed. Whoever has an urge to look at a "naughty picture," but who also needs a moral to make himself feel guilty, should stay away from Picasso. The eroticism is justified in this artist only by the esthetic element. We may also say that the esthetic at times is kept from mere prettiness by a shocking reference to the sexual.

A few years ago Frank Crowinshield in *Vogue* presented his thesis that contemporary taste, being essentially romantic, prefers strangeness to classic regularity in the

female face. He referred to Hogarth who had found in all excellent beauty "some strangeness in the proportion." We have not enough explored the strangeness of the whole figure; but we do know that a combination of such diverse factors as anatomical dislocation, mechanization, and sexuality have strange powers over the imagination—at once agreeable and grotesque.

But one is not going to explain all this explicity to John Doe.

(3) Religious paintings of the last century usually expressed humility. Christ was represented as were most churchgoers—as beaten little creatures, more mice than human. Men of strong character and expressive faces tended to be sinful. Churchgoing people still often make this curious identification. In number of printed reproductions, the most popular painting of the last decade in America was Grant Wood's *American Gothic*, a canvas in which two beaten and dulled characters of Iowa's cornlands pose in a pattern which the painter calls Gothic. Some critics believe the painter was attempting satire. Those devoted to the painting refuse this.

The visual realist has not since the Seventeenth Century been able to handle a Christ theme as significant and as dynamic as a *Crucifixion*. The modern artist with his abilities at abstraction often handles this theme convincingly, and even does this in cases where he himself is not Christian or professedly religious.

His treatment of the theme, and the theme itself, will offend some people. Among them are the beaten-minded, the low in spirit, the timorous people. These people want a religion which is big only so that it can protect them, like a St. Bernard which looks puzzled because he looks fierce without meaning to. The meek in spirit will find it difficult to understand most that we refer to as "modern art."

* * *

When one views a painting that is not meant to be visually illusionistic, he must be prepared for different intentions and unequal abilities in artists. It may be that the subject matter—figure, still life, landscape—is only the means by which the artist gets started on his rhythmic arrangement in color and space. If this is so, his arrangement may "come off," "work," "hold together," seem a unity—or it may not. In the former case, the work may seem dynamic and yet have the power for holding attention, or it may be easy and trivial. In my student years in Paris, for instance, I was always running across, practically stepping on, elderly English spinstresses who did fluid non-objective color arabesques they called abstractions. Silly things, suspended in emotional infancy like their makers.

Most of modern painting uses the formal elements of design and also some representation. What seems to us distortion of drawing, proportion, and perspective is not distortion at all if we think of the longest expanses of art in history. But Byzantine and Egyptian, archaic Greek and Celtic—these ages, relatively ignorant of and undisposed to the illusionistic aim, needed no rationale to discount it.

In our history-conscious era, we reject a visually imitative technique largely on two counts. First of all, as Rhys Carpenter and Le Corbusier have both told us, illusionism technically has been perfected. To carry forward the tradition, one must depend upon men who are not technical innovators. But an important satisfaction in creative activity is and must be technical invention. In many respects the creative artist is in temper close to the inventor.

Second, in an era of such stupendous knowledge-accumulation, the painter when he is informative through exact detail becomes tedious. We say, then, that he must suggest and not state explicitly. By innuendo and implication he informs us. When, for instance, the artist implies the human figure in its actions and in character, he has the advantage of using the beholder's imagination. He invites the viewer to enter into the creative act—which should be a compliment to the qualified viewer.

In the last ten years, it seems to me, most imaginative painters have neglected an element important to their art. Anxious for spontaneity and color, the solid and planned geometric structure is too rarely found. There is a danger here. For despite what I have said about the emotional expression, the art of painting has always been deeply indebted to architecture. Like a building, the picture must stand. Long after the initial excitement, we must wish to return for a further exploration.

THE SCIENCES IN PITTSBURGH

V. PHYSICS

By Frederick Seitz

The fifth in a series discussing Pittsburgh's contribution to the sciences

FREDERICK SEITZ

The contributions which physics has made to western civilization since the Renaissance are so inestimably great that it would be difficult to envisage our world without them.

PHYSICS AND CULTURE

First are the cultural and philosophical contributions. It is highly significant that the first great modern physicist, Galileo, ran afoul of those forces, principally within the Church, which resisted so strongly the advent of enlightenment that accompanied the Renaissance. Paradoxically, the subsequent development of physics, and in fact of science in general, has rendered religion two valuable services. First, physics has shown that a high degree of order underlies the material world about us. This may be interpreted in turn, in the manner of Spinoza, as the reflection of a highly rational Supreme Guidance. Second, in providing a systematic explanation of many of the natural phenomena which meet us on all sides, physics made it unnecessary for the clergy to devote as much of its energies to allaying the influence of superstitions as was necessary in the past.

To philosophy physics has contributed a much clearer understanding of the limitations which are imposed upon man when he attempts to draw conclusions concerning the world about him. In brief, it is now an accepted principle of physics that the experimenter is limited in determining knowledge of the world about him by the fact that the process of carrying out a measurement has an influence on the system being measured. Man cannot hope to obtain an objective picture of the universe "as it would be if he were absent." The information which he gathers by experiment in an attempt to draw a picture of the world is strongly influenced by his presence.

PHYSICS AND THE MATERIAL WORLD

A factual account of the contributions of physics to the material world reads almost like an account of man's material progress during the past four hundred years. In the first place, physics has provided for mechanical and civil engineering, both of which are very ancient forms of technology, a rational scientific basis on which to build. Hand in hand with chemistry, physics is now providing the equally ancient field of metallurgy with a similar fundamental basis.

Apart from the service which physics has rendered the fields of technology that existed before its birth, it has been the parent of three major fields of technology, two of which, namely optics and electrical engineering, are now so great that their origins in the physics laboratory are frequently forgotten. The third field, namely nuclear engineering, born in the recent war, shows every promise of becoming a giant of comparable stature.

Chemistry, which is a relatively modern science, owes to physics at least a major part of three of its most important fundamental tools: namely thermodynamics, statistical mechanics, and quantum mechanics.

Mathematics and astronomy are older branches of science than physics, and to them physics owes much. This debt has been repaid continuously throughout the past centuries.

To the nation at war the physicist offers

Frederick Seitz is head of the department of physics at Carnegie Institute of Technology. He did his undergraduate work at Leland Stanford University and completed graduate work at Princeton University in 1934. Before coming to Pittsburgh in 1942 he spent a period of time at the University of Rochester, the Research Laboratories of General Electric Company, and the University of Pennsylvania.

a wide variety of basic principles, measuring apparatus, and weapons. In fact the physicist has been responsible for some of the deadliest devices which man possesses. Although he knows that these weapons were created at a time when it was imperative that the Western Allies be in control of them, he realizes that they can destroy his own civilization if misused. This realization has sharpened the social conscience which has been part of his make-up since the dawn of his profession.

UNITY IN VARIETY

The contributions of physics to philosophy and to technology, though poles apart at first glance, are parts of the same development and are entirely inseparable. It is true that the different contributions have usually been made by different men who often lived in different countries. Nevertheless the individuals concerned are bound together by links of cultural understanding that spring from common appreciation.

EUROPE THE PIONEER

It is very important that the unity of the various parts of physics be clearly understood in the United States at the present time. Our country owes an enormous debt to physics for contributions during both peace and war. Without them Pittsburgh, for example, would be a small and crude settlement relatively isolated from the remainder of the nation. During the past our country has placed principal emphasis on the immediate contributions of physics to technology—and at great profit. That is not to say that we have not produced a few great physicist-philosophers. On the whole, however, the truly great pioneer work has been carried out in Europe since the Renaissance. In effect, the United States has in the past used the European source of fundamental knowledge as an almost inexhaustible well from which to draw information of great technical interest.

RESPONSIBILITY SWINGS TO AMERICA

Today the source of European culture is badly damaged. It requires little imagination to conclude that at least in the near future the nations east of the Channel will not contribute so richly as in the past. We are now thrown essentially upon our own resources and must prepare our own well to satisfy the majority of our needs if technological advance is not to slacken.

PHYSICS YOUNG HERE

Let us consider physics in Pittsburgh in relation to that of the remainder of the country. The American Physical Society, which is the central organization of physicists in the United States, was founded in New York City in 1899. This is to be contrasted with the Royal Society of London, which was founded in 1660. In brief, organized physics is less than fifty years old in the United States. Pittsburgh's advent to the field in an organized manner is relatively new, even on this scale. The Physical Society of Pittsburgh celebrated its twenty-fifth anniversary in 1948. Almost without exception the charter members were very young physicists who had recently arrived in the city; most of them are actively engaged in research, teaching, or laboratory administration at the present time!

ADVANTAGES AND DISADVANTAGES

This situation, which is so obviously a characteristic of the rapid pioneering growth of our country, evidently has many striking advantages. First among these is the fact that relatively young men have been given important responsibility in the science. This in turn has permitted them to develop qualities of leadership which represent one of our great national assets.

Advantages of this type are offset by the fact that American physics has spent so much time on the materialistic and administrative aspects of its own needs and those of the nation that it has not gone very far along the road toward developing traditions in the philosophical aspects of the field which formed such an essential part of the European development. In the main, our great physicists have tended to be inventors of ingenious devices and proficient organizers rather than discoverers of deep-seated natural laws. European physics can probably claim at least ten times as many fundamental discoveries, even though the aggregate number of European physicists since the Renaissance is probably not over one-third the

membership of the American Physical Society.

PROFESSOR STERN AND RESEARCH

Pittsburgh, being a relatively newly formed center in a pioneer nation, exhibits all the national characteristics in relatively early form. Until 1934 the most outstanding physicists in our community were involved either in developmental work in the great industrial laboratories of the community, where they made many of the important discoveries associated with our recent technological progress, or were occupied in teaching activities in the academic institutions of the city under conditions in which research was placed in a subordinate position.

In that year, our city became the new home of Professor Otto Stern. Stern's arrival in Pittsburgh was a momentous event in the life of its physics, not only because he was awarded a Nobel prize during his period of residence here, but because his presence may well have represented a turning point in academic history in the community. For the first time there was established in our city a group engaged in graduate training of physics with a leader of international reputation who was an outstanding exponent of the philosophical aspect of physics.

LOOKING INTO THE FUTURE

There is little doubt that the physics which is being supported so admirably in the many industrial laboratories of the city such as the Westinghouse Research Laboratories, the Gulf Research Laboratories, the Mellon Institute of Industrial Research, and the Research Laboratories of the Aluminum Company of America will continue to be supported at an ever-broadening scale. At the present point in our technological age the success of industry depends so immediately upon the developmental research carried on within industrial laboratories that techniques for handling such research have become greatly standardized.

ACADEMIC ASPECTS

In the main then, the scene in which the most critical developments will occur is the academic one, not because the industrial aspects are unimportant, for the converse is true, but because academic fields of science are more easily subject to misadventure. The benefits derived from those more fundamental forms of research which can best be carried on in academic laboratories, and which are so essential for our form of civilization are, unfortunately, so diffuse and subtle that they are much less apt to be appreciated than the results of industrial research. Moreover, incorrect emphasis may be placed upon the spectacular side of a development instead of on the more profound and far-reaching results achieved through studied effort.

The principal centers of academic physics in the Pittsburgh area are University of Pittsburgh and Carnegie Institute of Technology. Both institutions contain a group of young physicists who are carrying on a very large share of the work which will determine in time to come the stature of the community in the academic field. Since both academic institutions are very young, even for a nation that is noted for young universities, many problems must be solved before they can be regarded as established. Quite apart from the financial problems faced by endowed institutions during these days of rising prices and salaries, and which are serious enough, there are problems relating to the establishment of adequate traditions in all fields of scholarship as well as physics.

Both institutions spent their early years relatively far from the main current of academic life of the nation. Both attempted to establish reputations rapidly by adopting unique programs and practices rather than by attempting to excel through slow and careful development in the traditions which have been growing through centuries. Plans of this type were doomed to failure because they lay so far away from conventional growth that they had the effect of repelling from our academic life the vast group of scholars who find the conventional methods of pursuing scholarship essential.

COMMUNITY SUPPORT NEEDED

During the past fifteen years both institutions have gone very far in the direction of correcting the divergences; both are now well on the road to being accepted members of the American academic community. In spite of these gains, it re-

mains to be seen if they will continue to follow traditional courses. In the last analysis this depends not so much upon the views of the scholars who inhabit them as upon the attitude that the community as a whole takes toward them and the degree and kind of support that it renders. The issue under test is whether or not Pittsburgh is on the road to achieving the type of maturity that characterized communities such as Boston, Philadelphia, New York, Chicago, and San Francisco.

ABOUT THE SYNCHRO-CYCLOTRON

By John G. Fox

JOHN G. FOX

Perhaps some who have read the recent news releases on the synchro-cyclotron being built by Carnegie Institute of Technology may be curious to know more about it. Why is it being built? What will it do? How is it being built? The following paragraphs are an attempt to answer these questions.

FUNDAMENTAL NUCLEAR RESEARCH

What are the smallest particles into which matter can be divided? What sort of things are these particles: what is their mass; are they charged electrically or magnetically; what sort of forces exist between them, that is to say, how is matter ultimately held together?

Nuclear physics is seeking the answers to such questions. Quite possibly it may be found that some of the questions that are asked are meaningless, that they have no answer. The Greeks used to ask about the color of atoms. Today we know it is as meaningless to speak of the color of an atom as to speak of the number of inches in a minute. Modern physics is in the habit of giving strange answers to what sound like reasonable questions. For example, most people would feel that it is quite logical to ask, "Does light consist of waves or does it consist of particles?" Modern physics answers: "Whichever you please. It can be proved that it is a wave motion and it can also be proved that it consists of particles. However, it cannot be proved that it is at one and the same time both."

The only way to discover the answers to our questions or to find out whether they are meaningful is to break matter up into the smallest parts that we can, and then to study those parts. That is the purpose of the "atom-smashing" machines.

One may ask: Why are these machines constantly being built larger and larger? Suppose a person wanted to discover the laws of ordinary mechanics and suppose that all he had to work with were billiard balls covered with molasses. By making two of these balls collide and measuring their velocities before and after a collision he could learn some of the laws governing their motion. At low collision speeds the two balls would stick together and only at high speeds would the balls bounce off each other the way clean billiard balls do even at low speeds. It is clear that there would be difficulty in deducing the laws of mechanics from observations of slow collisions between molasses-covered billiard balls—particularly if it were January.

This is a very crude picture of what we are up against in studying the laws obeyed by the elementary particles in the nucleus of an atom. Here the study of collisions between nuclear particles is the most promising method we have of discovering what kind of force they exert on each other.

John G. Fox has been assistant professor of physics at Carnegie Institute of Technology since 1946. Previously he had been research physicist for two years at the Los Alamos laboratory of the University of California and from 1941-45 research physicist for the Hercules Powder Company in Wilmington, Delaware. A graduate of the University of Saskatchewan in 1935, he took his Doctor of Philosophy degree at Princeton in 1941. He is a member of the American Physical Society and the Society of the Sigma Xi, and has collaborated in a number of articles for technical publications.

Because of the tendency of these particles to stick together as the molasses-covered balls do, we must make use of high-speed collisions. This means using high-voltage atom-smashing machines. Otherwise it is hopelessly difficult to interpret the observations and discover the laws of nature involved.

In this way the 400-million-volt Carnegie Tech synchro-cyclotron, now being built, will help in discovering the as yet unknown laws of attraction between protons and neutrons in the nuclei of atoms. It will also make it possible to find out something about mesons, which are lighter than protons and neutrons, and which can apparently be produced, in some unknown way, during a high-speed collision of the heavier particles. Mesons appear to be intimately connected, in a way which is not yet understood, with the forces by which protons and neutrons are held together.

HOW A SYNCHRO-CYCLOTRON WORKS

In the synchro-cyclotron, high energy is imparted to protons or other charged atomic particles, and these are directed like bullets at the nuclei of other atoms. These "bullets" are given their high energy by an ingenious trick which repeatedly applies an electrical force to the protons, adding to their speed (or energy) each time the force is applied.

The synchro-cyclotron consists of a hollow, semicircular segment, similar to half of a pillbox, which has been placed between the circular poles of an electromagnet. Called a "Dee" because of its shape, the segment is contained in a vacuum tank and is given a high frequency alternating voltage.

Electrified particles, such as protons, are released next to the Dee, midway between the ends of its straight side and at the center of the gap between the poles of the magnet. The protons are then alternately attracted and repelled, depending on whether the Dee has a positive or negative charge. The magnetic field between the poles causes the protons to follow a circular path. By the time a proton traveling inside of the Dee has returned to the straight edge of the Dee, the charge of the Dee has changed and the proton is repelled away from the Dee to the region outside. With the next change of the charge it is drawn back to the inside of the Dee. Each time it gets an extra push and follows a larger diameter path.

By the time the protons approach the outer semicircular rim of the Dee, they have acquired many times the energy imparted to them in each push. They then enter a deflector which draws them to a target where they are used to bombard other atoms.

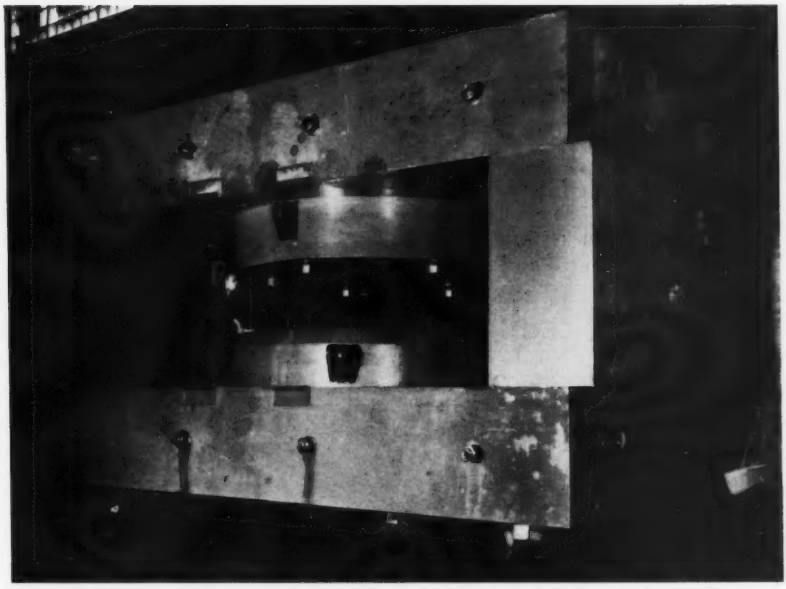
Up to this point the processes described are those that take place in an ordinary cyclotron.

However, as protons increase in speed they also increase in mass, and this causes them to move more slowly in their circular paths. The protons must reach the straight edge of the Dee at just the right instant in the electrical oscillations; for example, the push they get must be in the direction they are moving and not opposite. Therefore provision is made in the synchro-cyclotron to reduce the frequency of oscillations as the protons increase in mass. With this arrangement they still reach the edge of the Dee at the proper instant.

HISTORY OF THE TECH CYCLOTRON

Carnegie started on the road toward its present 400-million-volt synchro-cyclotron with a $300,000 gift from the Buhl Foundation in 1946. At the time the money was given, Tech planned to build a 200-million-volt atom smasher. As further assistance was realized, it became possible for Carnegie to set its sights on having a larger magnet with 130-inch pole tips instead of 110-inch pole tips. This was calculated to increase the output of the cyclotron from 200 to 280 million volts. Simultaneously improvements over conventional magnet design were made, through calculations and experimental tests at Tech, which boosted this figure to 350 million volts.

Later from cyclotron experiments at the University of California it became clear that mesons could be produced in a clean-cut fashion by collision of protons with other protons only if the energy were greater than about 350 million volts; the exact value of this "threshold" voltage was uncertain. This was a surprise since the mesons which had been known for several years in cosmic rays had a mass which should have enabled them to be produced in the laboratory well below 350



LOOKING OVER THE NEARLY-THREE-MILLION-POUND CYCLOTRON MAGNET AT THE HOMESTEAD WORKS OF THE CARNEGIE-ILLINOIS STEEL CORPORATION

million volts. However about this time it was discovered by physicists in Britain that cosmic rays contain a second kind of meson which was heavier than the first. The results from the University of California showed that in the laboratory it was possible to produce directly only the heavy mesons but not the light ones, for some unknown reason. This was why the "threshold" voltage was higher than expected.

Since the anticipated output of Tech's cyclotron was 350 million volts and since "proton-proton" mesons could only be produced with a minimum of "about" 350 million volts, it was by no means certain that mesons could be produced with the Tech machine by this elementary process. So Carnegie reset its sights for a 400-million-volt cyclotron (for which subsequently 142-inch pole tips were designed) and this larger machine became a reality through additional support from the Office of Naval Research and the Atomic Energy Commission.

Having acquired sufficient support to begin the real work of the cyclotron project, Carnegie next needed a site for the atom-smasher. Although it was originally planned to build the cyclotron on the campus, it was decided to change the location to a site which would allow for expansion of nuclear research facilities in the future. A suitable site was found in sixty acres of the Westinghouse property at Saxonburg, Pennsylvania, former KDKA transmitting-station area.

The cyclotron is expected to be in operation during 1950.

CHARACTERISTICS OF THE CARNEGIE CYCLOTRON

The magnet of the Tech cyclotron will not suffer a loss in capacity to produce energy because of its compactness and relatively light weight of only 1,500 tons. Through careful design, based on extensive tests, an energy output equal to other machines of up to twice the weight is expected from this comparative midget among giants.

The "shims," as the pole tips are also called, have deep concentric grooves near the edge. As a result of this new design, the useful magnetic radius should be extended

(*Continued on page 221*)

Among Our Friends

THE most recent of the vastly generous gifts of the Mellon family to various institutions in their home city has been announced. A grant of six million dollars has been made by The W. L. and May T. Mellon Foundation to establish the nation's first graduate school of industrial administration at Carnegie Institute of Technology. William Larimer Mellon, who established the Foundation in 1939, was one of the founders of the Gulf Oil Corporation and its active head for forty-six years, retiring just last year from the chairmanship of the board. He has been a trustee of Carnegie Institute of Technology, Carnegie Institute, and Carnegie Library for twelve years.

WILLIAM LARIMER MELLON

This school, to be known as the School of Industrial Administration, William Larimer Mellon, Founder, will select for admission only college graduates or other students who in at least two years of college have shown superior qualifications for such work. It will offer a three-year program including one year of graduate work leading to the degree of Master of Science in Industrial Administration. It is hoped that the School may be established within a year.

In making the announcement, Carnegie President Robert E. Doherty stated that at least one million dollars of the gift will be used to erect a building on the Tech campus and about five million to endow the new School. No architect's drawings or blueprints of the building are yet available, but it will probably be erected within two years and until that time will be housed in existing buildings. Tech's present department of industrial administration will be transferred to the new School.

The gift was accepted by the Carnegie Tech Board of Trustees at a meeting on January 17 in the office of Board Chairman James M. Bovard.

Enlarging on the purpose of the new School, President Doherty stated: "It will fill a great national need for administrators whose business training is strengthened by the capacity to understand technological elements of financial, personnel, and administrative questions. . . . The need for such men is clearly illustrated by the fact that well over 50 per cent of technical engineering graduates, after forty years of age, are found in positions of administrative responsibility in industry. . . .

"I can think of no one who is in better position than William Larimer Mellon to judge the need for such a school and the fundamental qualities that should be sought in its graduates, for he himself has created and managed a great industrial corporation."

When completely organized, the overall educational plan of Carnegie Institute of Technology in the industrial field will include a basic freshman and sophomore program given outside the new School. At the end of this period, according to present plans, students may continue undergraduate work stressing industrial engineering and earn a bachelor's degree in the College of Engineering and Science, or may apply for admission to the School for the three years leading to the master's degree.

The W. L. and May T. Mellon Foundation was created as a trust exclusively for religious, charitable, scientific, literary, and educational purposes. The present trustees are William Larimer Mellon; Mrs. John F. Walton, Jr., and Mrs. Thomas Hitchcock, Jr., daughters of the founder; Matthew T. Mellon and William Larimer Mellon, Jr., sons of the founder; William S. Moorhead; and Thomas L. Orr.

A GIFT FROM HEINZ ENDOWMENT

The Howard Heinz Endowment this past month made a grant of $133,000 to Carnegie Institute for expansion of its children's and adult educational program. This grant, announced by H. J. Heinz II, chairman of the trustees of the Endowment and a trustee of the Institute, is the largest single gift, outside of Carnegie funds, ever received by the Institute. It is also the largest grant made to a single institution by the Howard Heinz Endowment since its creation in February 1941.

"The grant is made to Carnegie Institute," Mr. Heinz explained, "to enable it to explore new educational activities and to assist in placing the Institute in the front rank of those museums which are endeavoring to become greater cultural and esthetic assets to their communities. We anticipate that our grant will make it possible for the Institute to carry forward what we hope will be a unique experiment in both child and adult education."

The funds will be applied to the program of the newly created division of education under direction of Arthur C. Twomey. It will provide for the organization of groups of children and adults interested in natural history and the fine arts as a hobby, in the development of a student museum, a student art gallery, and in the producing of educational material, both written and photographic, explaining exhibits and activities. It will expedite the current efforts of the Institute to make its tremendous facilities and collections available for greater use by the citizens of Pittsburgh and the tri-state area.

AMETHYSTS

The February birthstone is featured in a Museum display of amethysts from Pennsylvania, Georgia, North Carolina, Brazil, Uruguay, and Hungary.

THE SYNCHRO-CYCLOTRON

(Continued from page 219)

to 96.5 per cent of the actual pole-tip radius. By comparison, other cyclotrons are able to maintain high magnetic fields only to about 85 to 90 per cent of their respective shim radii. The magnetic field strength is expected to be greater than that obtained in other cyclotrons.

A frequency-modulated oscillator has been developed with improved design because of the unusually high frequency required to stay "in tune" with the abnormally high magnetic field.

Surrounding the top and bottom poles of the magnet will be copper coils 20 feet in diameter, encased in stainless steel and weighing 87 tons each. The coils will carry 20,000 amperes and will produce in the magnet a field of 20,000 Gauss (the earth's field is about ½ Gauss). A special direct-current generator of the "homopolar" type, which will produce 20,000 amperes and 20 volts, will provide current for the coils.

Through calculations and tests on the optimum shape and location of the coils and through a new method of cooling them which permits the use of a very high density of copper, the Tech magnet should require only about one-half the power used by other cyclotron magnets of comparable size. Since the power bill for the magnet alone will be some $15,000 a year, it is clear that the improvements which have been made are of importance.

The coils have been wound at the Navy Yard in Brooklyn, New York, and will be shipped by water around the Gulf of Mexico and up the Mississippi and Ohio Rivers, the last lap being by truck.

Although it is the Tech Physics Department which is primarily concerned with the cyclotron project for its role in fundamental research in the laws of nature, other departments of the school are co-operating in the effort; and in so far as the field of nucleonics is concerned interest and activity are college-wide. In the College of Engineering and Science various departments are engaged in some phase of this field either in fundamental research or studies of application. The College as a whole is occupied with developing educational programs in nucleonics.

MASTERPIECES FROM THE BERLIN MUSEUMS

By Homer Saint-Gaudens

HOMER SAINT-GAUDENS

ONCE upon a time, in fact for a very long time indeed, both the wealthy and the poor of Europe fed their bodies with bread and meat and their souls with religion and fine arts. Half-consciously our mechanized age recognizes this fact. If it were otherwise, there would be scant reason for excitement over the wartime destruction of monuments which have recorded through the centuries the emotional progress of our progenitors across the seas. We gasped as we heard that the ravages of shell fire wrecked the monastery of Monte Cassino. Our toughest and topmost "Brass" instructed our aviators to smash the Rhine bridge and the Cologne marshalling yards but in peril of their lives to spare Cologne Cathedral a quarter of a mile away. I will admit our pilots broke nine-tenths of the windows in it and knocked off a few corners, but they did the best they could. Even the Germans spared the Pont Neuf in Paris and the Ponte Vecchio in Florence, though the jewelry shops and the passage on the bridge from the Pitti to the Uffizi Galleries have vanished.

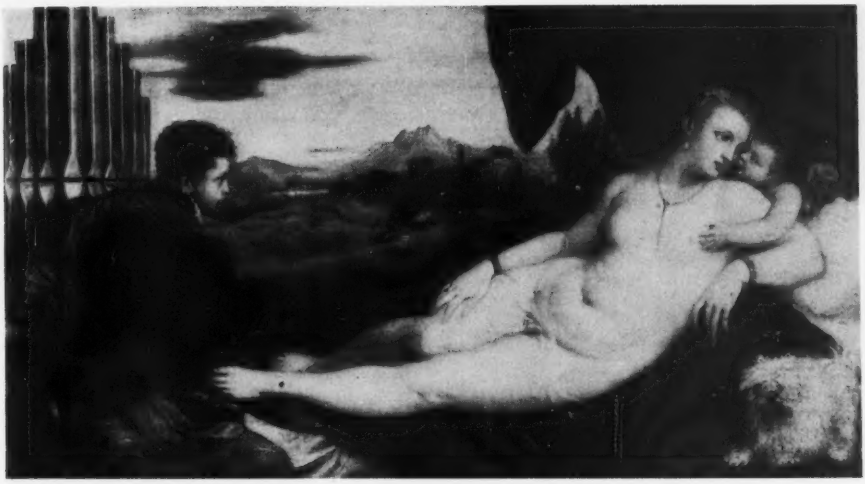
The most responsive of the visual arts is the art of painting. Danger to this art during the late war caused the governments on both sides of the line to abandon certain efforts to preserve life, food, and shelter to see to it that the art held most dear by mankind might be preserved. That is why on February twenty-seventh there opens to the Pittsburgh public a collection of ninety-three paintings. All but the Manet from the National-Galerie formerly hung on the walls of the Kaiser-Friedrich-Museum in Berlin. Certainly on a tour of American art galleries we could find a wider range of examples of this essence of the growth of European culture, but here in one place is a fine representation of European painters from 1400 to 1879.

These canvases were unearthed by the 90th Division of the Third Army when, on its advance, it discovered them with many other pictures buried two thousand feet in a salt mine near Erfurt. In December 1945 a consignment of the paintings was brought

THE VIRGIN AND CHILD ENTHRONED WITH AN ANGEL
BY HANS MEMLING
Flemish, 1433–94

Homer Saint-Gaudens, director of the department of fine arts at Carnegie Institute since 1922, has assembled twenty-one of the annual art exhibits at the Institute. Seventeen, shown previous to World War II, were International exhibitions. One, in 1940, was a Survey of American painting. The last three, of contemporary painting in the United States, he has organized since his discharge from the Army.

A graduate of Harvard University, Mr. Saint-Gaudens is the son of the late Augustus Saint-Gaudens, American sculptor.



VENUS WITH THE ORGAN PLAYER BY TITIAN
Italian, Venetian, c. 1477–1576

by the Army to the United States to be stored in the vaults of the National Gallery in Washington. Later, as evidence of good will toward Germany, our Military Command decided to return the pictures after exhibiting them in the National Gallery in the spring of 1948. Naturally, the artistically minded elsewhere promptly cried, "Me, too," bringing to bear such political pressure that the portion of the group which could withstand the wear of travel is being sent to thirteen cities.

The core of this collection came originally from wealthy and discerning patrons of the arts. That stiff-backed military genius Frederick the Great began it. For *der Alte Fritz* combined successful predilections for iron ramrods and a rippling line of fire with promotion of esthetics. Not only did he furnish Voltaire with a special apartment in his palace at Sans-Souci near Potsdam where Voltaire could write a few poems that Frederick could sign, but Frederick also bought the Watteaus which may be seen in this exhibition.

However, it was under King William III that the Prussian royal museum was established; whereafter the acquisitions grew by way of leaders of German culture. Purchases were made from the Giustiniani Collection of pictures; for example, the Ter Borch *Fatherly Advice*. From the Solly Collection was bought Botticelli's *Venus*. Vermeer's *Young Lady with a Pearl Necklace* came from the Barthold Suermondt Collection in Aachen. The art critic Wilhelm von Bode contributed Guardi's *The Piazzetta, Venice*. Rembrandt's *The Preaching of St. John the Baptist* crossed the channel from the English house of the Earl of Dudley.

Here are represented masters from many lands. Lucas van Leyden was Dutch; Titian was Italian; Velásquez was Spanish; Watteau was French; Christoph Amberger was German; the unknown painter of *Christ on the Cross with the Virgin and Saint John* was Austrian; Memling was Flemish.

This collection of the lustre of art records a phase of the advance of the European social order through the succeeding ages, just as in another manner the history of today is set forth in print. Primitives like *The Crucifixion* by Giovanni di Paolo reflected the mystic religious fervor of the quattrocento. Later, religious esthetics moved into sophistication with the German Hans Burgkmair's *Holy Family*. Then came that great wave of art and literature, of research and learning, which we call the Renaissance. The initiative for the passing of the European man from the medieval to the modern is credited to Italy. Petrarch helped start it. Art, intrigue, and religion were companion topics of the day. Botticelli painted his *Primavera* for Lorenzo de Medici about the time that young Giu-

liano de Medici was knifed to death by the rival gang known as the Pazzi. Within the same memory of man, Savonarola was burned at the stake in the Piazza della Signoria in Florence for objecting to Medici luxury. Yet in the midst of all this excitement art reached a peak.

Up north on the shores of the Baltic the Hanseatic League had produced its men-of-affairs. In the Flemish and Dutch lowlands business guilds flourished. Always the wealthier applied a share of their prosperity to the advancement of culture. They built one of the greatest libraries of their day at Louvain. They spread their largess on Peter Paul Rubens, who had studied in Rome to return to Flanders to paint in his grandest of all grand manners the *Virgin and Child Enthroned with the Saints*.

As nobility grew in opulence, Francis I of France met Henry VIII of England on the Field of the Cloth of Gold. Then it was that Holbein crossed the channel to create likenesses of Henry VIII and his family along with such other paintings as that of *An Elderly Man* which we have in this exhibition. Titian, too, in Venice made portraits. You can see here his own likeness and that of his daughter. For in those days no one questioned the place of portraiture in fine arts, however our Sheridan Square bistro cognoscenti may sniff at such modern "commercial" work. Take a look at Joos van Cleves' *A Young Man with a Glove*, or Hans Bladung's wooden panel of the *Count von Lowenstein*, or Andrea Sacchi's representation of our fat friend *Alessandro del Borro*.

A more homely but no less well-loved art came into recognition. Frans Hals emphasized character in his *A Little Girl with her Nurse*. In a quieter vein, Pieter de Hooch painted his conversation pictures, call them genre if you like, which recorded the cheerful, well-to-do family life of the flourishing Dutch.

Landscapes appeared. There had long been landscapes serving as backgrounds, as when the Flemish Joachim Patinir painted his fantastic scene in his *The Rest on the Flight into Egypt*. Now appeared landscapes which were just landscapes and nothing else. Some proved classical, as with the Frenchmen Claude Lorrain and Nicolas Poussin. Others were romantic, such as Hobbema's *Winding Road*.

Not long after, European social thought began to sober up as the French "Age of

THE GREENHOUSE BY ÉDOUARD MANET
French, 1832–83

PORTRAIT OF THE COUNTESS OLIVARES
By Velasquez
Spanish, 1599–1660

Reason" emphasized realism and security. Jean Jacques Rousseau spread his philosophy. Emotion, enthusiasm, violence, and religion were held in disdain. So again the aspect of picture-painting changed. The answer was reflected in the placid contemplation of Chardin's *The Draftsman*.

Perhaps this was the proper place to call a halt. Anyhow, the bulk of the exhibition comes no nearer our present day. True, the collection includes *The Greenhouse* which the Frenchman Manet painted in 1879. That canvas, though, was far from representative of the years of overstuffed red plush ottomans when the Baron Haussman bought his Paris real estate, built his boulevards, sold his real estate, and reaped the results to the great astonishment of his wife and no one else.

Here we should ask ourselves what this exhibition teaches. First, notice that most of our sensitive souls have persisted in being as much admirers of supreme technique in painting as in cabinetmaking. The art of painting is as firmly based on craftsmanship as the art of music. In music, craftsmanship and imagination are separated. Bach may write his *G Minor Sonata* but Menuhin could not produce the results without his Stradivarius violin. In painting, these requirements are combined. To produce an intriguing spot on the wall, the painter must have not only trained taste but able craftsmanship. The painters of this exhibition then, by skill of hand, by wealth of imagination, by sensitiveness to color, by feeling for design, moved to the one and only end of their art in the production of enduring visual gratification in others.

Emphasize for yourselves the word "enduring." As you walk through the galleries you will miss our topical social attempts at reform. The art of those good old days flowed in a live and varied stream but always within its banks. Only of late has painting broken beyond its proper levees to spread confusion of esthetic thought.

Emphasize, too, the words "in others." Those men of genius applied their skill of adornment to the desires of their public. The notion that the main glory of art is the self-expression of the artist, that art is his private affair, is a modern idea. In the days of fervor and style, art was a public institution, a milestone, and heritage of the human race.

Art, too, in the then we now regard, was not a conspicuous waste of mediocrity. It was a symbol of luxury. The public reaped the benefit, true enough, yet the original result came from wealthy amateurs', dilettantes in the finest sense of the word, putting in their contracts what they expected from the painter.

In those days beyond recall, art did much for the social order and the social order did much for art. Fair exchange is no robbery. On the contrary, it produced masterpieces.

L'HYMNE INTÉRIEURE

The bronze by Émile Antoine Bourdelle presented by Mrs. Lambert Oppenheim, of Cleveland, has taken its place on the second floor with the Institute's permanent collection of bronzes, which includes the Bourdelle *Herakles—Archer* also given by Mrs. Oppenheim, last year.

MAMMAL HALL

The Hall of North American Mammals has been completely rearranged during the past few months, and deserves a visit of inspection. Among the exhibits may be seen Atlantic walrus, mountain and barren ground caribou, mountain goats, Pennsylvania deer, and that prize-winning old favorite, "The Camel-Driver."

THE CARE AND FEEDING OF HOUSE PLANTS

By LeRoy K. Henry

PHILODENDRON

The cultivation of plants in the home dates back to early antiquity. The Greeks and Romans grew plants in pots and it is likely that they took them into their homes during the winter season.

Most plants require a well-lighted situation and sunshine, although a few can exist for a long time in a dim corner. In our centrally heated homes today, some plants cannot be grown because of the lack of moisture in the air. Artificial gas used in cooking and heating is deadly to most plants, and one part gas in two hundred thousand parts of air is sufficient to injure the very susceptible ones.

If we wish to have an indoor garden, we must humidify the air as much as possible, water the plants regularly, use the right soil mixture, fertilize frequently, and fight pests when they appear.

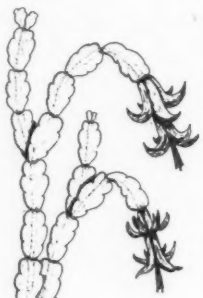
Cacti, of which there are many varieties, thrive in a hot, dry atmosphere with plenty of light. Thorough watering of cacti twice a week is usually sufficient. Other succulents such as aloe, gasteria, kalanchoë, bryophyllum, and jade plant grow well in this habitat. There are many varieties of aloes, with long narrow leaves of various shades of green mottled with white and edged with prickles or spines. The gasterias are similar in growth, with smooth or warty green leaves arranged in two ranks.

In potting succulents, place a layer of pebbles, one inch deep, in the pot and use a mixture of equal parts of loam, sand, leaf mold, and broken bricks or flowerpot chips with one-half cupful of bonemeal to each peck. These plants like a sunny, south-facing window and are at home on glass shelves hung from the sash frame.

With the exception of succulents and the acid-soil plants, the majority of house plants will grow well if placed on a table in front of an east-, south-, or west-facing window. They require a general-purpose soil mixture consisting of four parts of loam, two parts of sand, one and one-half parts of dried cow manure, and two parts of leaf mold, with one-half cupful of bonemeal per peck.

African violets, begonias, and ferns need more humus in their soil, therefore increase the dried manure content to two parts. During summer and early fall these plants should be shaded from the direct rays of the sun. A thorough watering three times a week is sufficient, unless the air is very dry. They should be fertilized once a month during the flowering or active growing season with plant "tabs," or dissolve one-half teaspoonful each of nitrate of soda, superphosphate, and muriate of potash in a gallon of water and use one pint of this mixture for each plant every three weeks.

The Christmas and orchid cacti are not succulent types and need a modified general-purpose mixture—one part leaf-mold, one part well-rotted manure, and three parts of peat moss. Early in September place the Christmas cactus in a western or eastern window and keep it on the dry side until buds begin to form, but spray the foliage once each week. While it is in flower it should be watered moderately. When the weather gets warm, put the cactus outdoors and water it every two weeks with a weak, liquid-manure solution.



CHRISTMAS CACTUS

Some house plants are in reality small shrubs. An old favorite used to be the flowering maple, with its maplelike leaves and hoopskirtlike, papery flowers like small hollyhocks. Prune the old plants in September to encourage new growth for winter blooming, and place in a sunny window. Cuttings may be rooted in sand.

Poinsettias can be kept from year to year if properly handled. Water normally until the flower dies and about half of the leaves have fallen, then gradually reduce the supply until the soil is completely dry, and store in a room at a temperature of sixty degrees Fahrenheit. About the middle of April cut the plant back to stalks six inches in length, repot using a general-purpose mixture, water, and place in a sunny window. When the weather is warm enough, put the potted plant outdoors in a sunny location and leave it there until cold weather begins. The crown of thorns, a relative of the poinsettia, should be cultured as you would cacti, but it should be kept on the dry side during November and December.

ALOE

The gardenia, an extremely sensitive shrub, must have a correct soil mixture, an even temperature of sixty degrees, and moist air and soil at all times.

One of the commonly grown vines is the grape ivy, belonging to the grape family. The leaves of this are compound and consist of three glossy, toothed and pointed leaflets. This plant does well either on a trellus or hanging from a bracket attached to the window frame, and can endure heat and dryness of air. In potting, use a general-purpose mixture of soil and keep the roots moist. Place it in a well-lighted north window and spray the foliage once a week or oftener. Cuttings brought indoors in the fall will grow nicely for several months in a vase of water. Philodendrons, belonging to the arum family, are as popular as ivys for window vines. They like a moist soil and a north-facing window, but will grow for some time on mantelpieces far from a direct source of light. The heart-leaf philodendron is one of the most shade-enduring and most tolerant of house plants. The ivy-arum closely resembles philodendron, but its leaves are blotched with cream or yellow if it gets the sun.

GRAPE IVY

The wandering Jews are not particular as to soil and will even grow in water for long periods. Some have plain green leaves, others have green leaves striped with yellow, and still others have leaves that are reddish purple beneath and silvery with green markings above. These plants can endure some shade, but in such a situation the markings on the foliage will not be so distinct.

Among the foliage plants the asparagus ferns, cast-iron plant, snake plants, and dracaenas belong in the lily family. The asparagus ferns require rich soil and plenty of water when growing. The cast-iron plant is so called because it is able to thrive almost anywhere. Some varieties have leaves spotted with yellow, others are green and white striped. The snake plant is quite unattractive to some persons, with its long green, swordlike leaves mottled with another color. The variety with green leaves edged with yellow is more colorful. The snake plant is usually used because it will survive in a darkish corner and will withstand neglect. Do not overwater during winter. The fragrant dracaena becomes very tall with arching cornlike leaves, three inches wide and often two or more feet long. In one variety the leaves are striped with yellowish green, in another with creamy white. The gold-dust dracaena is low growing and branching in habit with small oval leaves spotted with green and white. The fan plant or winter iris makes a lovely foliage plant,

with its dark green, swordlike leaves arranged in a fanlike manner. Its flower lasts for a day and looks like a small iris. Handle it as you would African violets and begonias.

One must not forget the ferns when discussing foliage plants. The best known one for indoors is the Boston fern, but the maidenhair, staghorn, and holly ferns are equally attractive. These plants are fine for growing where the light is not too bright. They like a north- or west-facing window and require constant moisture at the roots. Feed with one teaspoonful of nitrate of soda per gallon of water if the fronds become yellowish.

LeRoy K. Henry, curator of botany at Carnegie Museum the past two years, joined the staff as a part-time worker in 1928, the year of his graduation from the University of Pittsburgh. He took his Doctor of Philosophy degree four years later at the University. For the past three years he has taught a course in herbarium management at his alma mater. Ever since boyhood he has enjoyed growing plants inside his home and at present has a considerable number of African violets of various shades. His wife, Elinor S. Henry, who illustrates this article, leaves the plants to him, her time being occupied with the nurture of four young humans.

ODYSSEY OF THE ROBIN

By W. E. Clyde Todd

As our planet makes its annual circuit around the sun, a constant but continually varying area of its surface is exposed to the solar rays. A standing puzzle to the ancients, we now know that the changing seasons are due to the inclination of the earth's axis to the plane of its orbit. After the turn of the year, on or about the twenty-first of December, when—in the northern hemisphere—the sun, having reached its lowest point in the sky, begins to swing back again, the area of daylight advances northward at the rate of about twenty-three miles a day. But there is a time lag in effect, so that the first results of this advance are not at once apparent; indeed, this period usually brings our coldest weather. Officially, spring does not begin until March twenty-first.

STIMULUS OF SUNLIGHT

Not only is the sun our source of light and heat and energy, but also it sustains life. The growth of plants and the seasonal movements of animals are governed largely by its annual cycle. While both the calendar and the weather are saying that it is still winter, the lengthening days are already beginning to affect the spirits of certain of our resident birds. Among the first to feel and respond to the stimulus of the longer hours of daylight is the cardinal, which begins to whistle regularly as early as the last week in January, or even earlier in a mild season—as this year. In February the little black-capped chickadee offers a new note, a sweet and plaintive *phe-be*, entirely different from its usual twittering repertoire, and the song sparrows begin to tune up about this time also. To the observant bird student these signs are familiar and significant, but it is usually the arrival of the first robin from its southern winter quarters that excites the interest of the general public and earns a paragraph in the newspaper.

The robin is one of the earliest migrants

W. E. Clyde Todd is perhaps best known locally for his book, *Birds of Western Pennsylvania*, (1940) the standard ornithological work on his native section. However, he has described many new forms of bird life from South America and has made twenty-two expeditions to Labrador during which he has collected extensively. Since his retirement from the curatorship of ornithology at the Carnegie Museum in 1946 he has been working over these collections in preparation for a book on the birds of Labrador.

Mr. Todd joined the newly organized Museum in 1899, after nearly eight years with the division in the Department of Agriculture at Washington that later became the Bureau of Biological Survey, this work having followed his graduation from high school in Beaver, Pennsylvania. Perhaps his earliest ornithological achievement came at the age of fifteen when he discovered a magnolia warbler nesting outside of its previously known range. When he came to the Museum its ornithological study collection was practically nil, while today it stands fifth in size in the country.

The ravine where he found the magnolia warbler nesting has been turned over to the Audubon Society, to be known as the Todd Wild-Life Sanctuary. A Fellow of the American Ornithologists Union, Mr. Todd has published many scientific papers.

to reach us. A long series of observations shows that February 22 or 23 is the average date of its arrival in this latitude. Unseasonably mild weather may advance this date by as much as two weeks. In a cold and backward season it may be correspondingly delayed. Open ground is necessary for the bird's subsistence, and as long as snow and ice prevail its arrival need not be expected. Reports of arrival at much earlier dates sometimes cause confusion; almost always they prove to be based on individual birds which have wintered here. Almost every year a few odd birds elect to remain through the winter, in sheltered spots where such food as dogwood berries are available and water can be had. During the winter of 1911-12 many wintering flocks were observed.

WINTER HOME

The principal winter home of the robin, however, to speak generally, is the South Atlantic and Gulf states. Birds banded near Pittsburgh a few years ago were recovered in Florida. Before the robin came under the protection of the Federal Government, it was killed by the thousands and sold in the southern markets for food. In the winter season it goes about in flocks, sometimes of considerable size. The indications are that these flocks hold together during its northward movement in the spring. I have repeatedly observed compact flocks of many hundreds flying northward high overhead late in the evening, and again when they had obviously stopped to rest on the way. Not until the breeding grounds are actually reached do these flocks disintegrate and the separate pairs scatter to their respective territories. But even during the breeding season the flocking habit persists and leads to the establishment of roosts, to which the robins of all the surrounding region resort at night.

HISTORY OF ROBINS

The name "robin" is an unfortunate misnomer, traceable to the early colonists, who fancied a resemblance between this species and the "robin redbreast" of Europe—a much smaller bird. Our bird is actually much closer genetically to the European blackbird, which it resembles in habits and song. It has an extensive distribution, ranging entirely across the North American continent and northward as far as the trees go. The robin first appears in ornithological literature in 1731, under the name *Turdus pilaris migratorius*, in Mark Catesby's *Natural History of Carolina*. When Linnaeus, the great Swedish naturalist, gave it a binomial name in 1766, he adopted the latter one of Catesby's adjectives and called it *Turdus migratorius*—migratory thrush. Largely for this reason, Charleston, South Carolina, where Catesby made his observations, has been accepted as the "type-locality" of Linnaeus' name. This was unfortunate, since the species is known there only as a winter resident.

DIFFERENCES

Although a western race of the robin was discriminated in 1877, up to 1900 it was supposed that the robins of the eastern United States and Canada were one and the same. Then a Massachusetts ornithologist, Charles F. Batchelder (still living) discovered that the robins breeding in the southern Appalachians were appreciably smaller and paler than those from New England and northward. He therefore gave them a subspecific name, *achrusterus*. The question presently arose as to which form of robin occurred at Charleston. If it were the smaller race, then Batchelder's name *achrusterus* would become a pure synonym of the earlier

MR. TODD MEASURING A SPECIMEN IN HIS LABORATORY

(*Continued on page 233*)

ONE HUNDRED AND ELEVEN PRINTS

The gift of Kenneth Seaver to Carnegie Institute

By Virginia Lewis

VIRGINIA LEWIS

Carnegie Institute is fortunate indeed to have for its permanent collection in the Department of Fine Arts the splendid group of prints—a gift—which is on view in the balcony of the Hall of Sculpture through March 27. They come to the Institute through the generosity and vision of Kenneth Seaver. These prints, one hundred and eleven in all, reflect the sensitive taste of a discriminating individual who has bought what he likes, and as a result the entire collection has a quality of freshness which could only be achieved through the courage of conviction.

Prints have a universal appeal in subject matter and as records of people, places, and ideas they illustrate the history of culture. The wide range in point of time and media in such a collection offers an unusual opportunity for the consideration of craftsmanship in relation to esthetic development.

The fifteenth-century line engraving on copper is well represented. There are two prints by Andrea Mantegna, one of the greatest artists of the North Italian school, whose work shows a sculpturesque monmentality that almost denies the intimacy of the print. Both the *Risen Christ Between St. Andrew and St. Longinus* and the horizontal *Entombment* here are significant contributions to a print collection. These and the *Soldiers Carrying Trophies* from the "Triumph of Caesar," of the school of Mantegna, illustrate the technique of line engraving peculiar to the master. The diagonal return stroke of his parallel lines of shading and the immediate background of his important figures which brings them out in relief are devices easily recognized. Giulio Campagnola is also interesting for his technique of engraving which consists of short flick strokes producing an effect of tone which contradicts somewhat the principle of the line engraving. But the feeling for line is not lost certainly in his work *St. John the Baptist*, which retains much of the sculpturesque quality of Mantegna. This impression shows the signature "Appresso Nicolo Nelli in Venetia" in the lower right corner and is therefore of special interest to the student concerned with the problem of the printing of this particular plate. Impressions in several of the great museum collections have this signature cut off. Much of Campagnola's work is dependent upon that of the great painters, especially Giorgione. A figure of considerable importance in the closing years of the fifteenth and early sixteenth centuries, who worked almost exclusively after the designs of others, especially Raphael, was Marc Antonio Raimondi. He made of reproductive engraving a profession. He is represented here by *Cupid and the Three Infants* engraved after a design supposedly by Mantegna.

Perhaps the greatest of all line engravers and one who has worked in great abundance in this field is Albrecht Dürer. In this collection is an excellent set of his little Copper Plate Passion of sixteen plates, so called to distinguish it from other series of the Passion designed by Dürer both in copper and in wood. Following in the style

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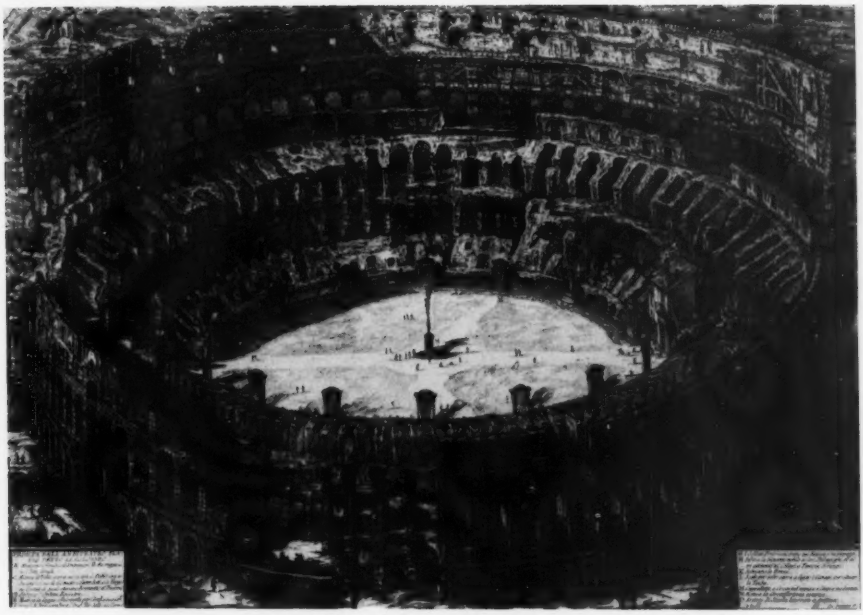
A knowledge of the varied techniques in printmaking and an appreciation of esthetic values are combined in Virginia Lewis' studies of the fine prints that are exhibited at the Institute from time to time. Miss Lewis is curator of exhibitions and instructor in the fine arts department of the University of Pittsburgh, where she teaches a number of courses in the history of art including "The History of Prints." She studied at Wellesley College, then took her bachelor's degree and did graduate work in fine arts at the University. Her studies in art appreciation have included work with the print collection in the British Museum, printing under Porter Garnett at the Laboratory Press of Carnegie Institute of Technology, and summer courses at Harvard on Rembrandt prints and the architecture of Henry Richardson.



THE COLOSSEUM, BIRD'S-EYE VIEW
Etching from "Views of Rome" Series
By Giovanni Battista Piranesi (1720-78)

of Dürer technically were a group of engravers known as the Little Masters because of the small size of the plates which they engraved. Hans Sebald Beham was one of these whose four small plates of the *Parable of the Prodigal Son* demonstrate his great facility with the graver. The last greatest expression in line engraving is that of the French portrait school of the seventeenth and eighteenth centuries and there are several excellent examples in the collection by its outstanding artists, particularly Robert Nanteuil. In addition to their esthetic value and technical facility, these portraits are of considerable interest as records of significant personalities.

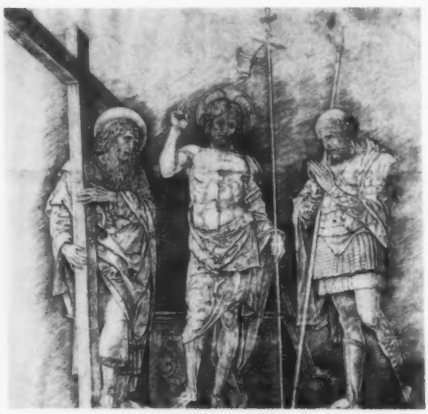
The medium of etching, a freer, more friendly and warmer kind of technique, can be seen here also in its beginnings in the portrait of *Charles V* by Jerome Hopfer. This was one of the earliest etchings and is combined with some engraving. Etching was used at first as a labor-saving device to alleviate the painstaking work of the graver, and as such assumed in its early stages the character of the line engraving. Later, in the work of the seventeenth, eighteenth, and nineteenth centuries the flexibility of the medium, which is really only drawing on a wax ground, was expressed in the design. Rembrandt's *Great Jewish Bride*, Adrian Van Ostade's *Strolling Musicians*, Claude Gellee's *Dance Under the Trees* show the etching in varying phases of its potentiality. Predominant in the collection are the numerous etchings by Giovanni Battista Piranesi, the great architectural print-maker of the eighteenth century. Piranesi has given us here in his famous Prison series, "I Carceri," the creation of a sensitive and rather terrible imagination. In direct contrast to his architectural fantasies are the somber and documentary "Views of Rome" series in which he has left a valuable record of many buildings of ancient Rome. That of the *Colosseum* is especially impressive both in design and in the dramatic handling of darks and lights.

In the eighteenth century, reproductive engraving became more complicated as a result of experimenting in engraving techniques. An interesting group of prints from this point of view are several by

Cornelis Ploos van Amstel, an important eighteenth-century collector. These have been done in aquatint, stipple and mezzotint, and in an engraving process which in effect suggests the crayon drawing. They have been used by him both separately and in combination to reproduce many of the seventeenth-century crayon and wash drawings from his own collection.

The aquatint, which is a variation of etching, was discovered in the latter part of the eighteenth century and is a process by which tone is achieved through acid biting of the copper plate. Often its tonal quality is emphasized by the line of the etching. The most forceful example of this combination may be seen in the aquatints of Francesco Goya, late-eighteenth and early-nineteenth-century Spanish realist who has done a number of series of prints depicting with unrelenting sarcasm the evils of his society. The most famous of these is "Los Caprichos," of which there are two on exhibition. The one *Hunting for Teeth* illustrates a popular belief that the teeth of a hanged man will bring good luck. In this print Goya shows a young woman becomingly reticent as she gropes for the somewhat macabre rabbit's foot.

There are examples too of the nineteenth century in etching in the dramatic work of Alphonse Legros's *Death of a Vagabond* and the more decorative style of Auguste Lepère. The latter excels too in the medium of wood engraving in which he achieves a silver and fragile brilliance. He is represented here in this technique by *Paris under the Snow* and *Felling the Pines*. It is interesting to note that the wood block from which this latter print was made is also included in the collection. An important portrait in the medium of etching is that of Felix Bracquemond's *Edmond de Goncourt* who was so outstanding in the intellectual and artistic life of France in the second half of the nineteenth century. Because of his great connoisseurship in prints this portrait is especially significant.



RISEN CHRIST BETWEEN SAINT ANDREW AND SAINT LONGINUS
Line Engraving
By Andrea Mantegna (1431-1506)

ALEXANDRE DUMAS (PÈRE)
Lithograph
By Achille Déveria (1800-57)

Another portrait of interest is that of *Alexandre Dumas* in his younger days, by Achille Deveria. Executed in the medium of lithography, it is an example of the changing treatment of the portrait. Deveria did a number of portraits of an introspective and psychological nature following the tendency of the times to emphasize mood and characterization. The medium of lithography, a nineteenth-century technique, lends itself to the freedom of drawing in the casual pose and the effect of dark accents. One of the earliest great artists to make use of lithography was Eugene Delacroix, French nineteenth-

century romanticist, who is represented impressively with the *Lion de l'Atlas* and *Tigre Royal*.

In a collection of this kind there is splendid opportunity to consider the quality of impressions, the matter of states, plate marks, watermarks, and the documentary recordings in the scholarly and definitive catalogues of the work of the individual artists, nationalities and periods such as those of A. M. Hind, Adam Bartsch, and others. These of course are problems for the specialist to delight in although there is always the possibility that the preoccupation with these minutiae might eclipse the enjoyment of the emotional import of the print. But for both the connoisseur and those interested in a general way these prints can provide great pleasure. Certainly this gift of Kenneth Seaver is a stimulating one, for it is in the accumulation of such fine collections that a great museum print department can grow.

ODYSSEY OF THE ROBIN

(*Continued from page 229*)

migratorius. Not until 1939, when Arthur C. Twomey, now curator of ornithology at the Institute, at my request, stopped over at Charleston and secured a good series of wintering robins, was the problem solved. Upon measuring these it developed that they agreed in size with another series collected in the Hudson Bay region.

As a result of these studies, several interesting facts emerge. We find that the large, darker-colored robin of the north country migrates to the latitude of South Carolina for the winter. It returns through western Pennsylvania in flocks in April, when the local birds are already nesting. Our breeding birds are intermediate in their characters between the northern and southern races, but nearer the latter. Some of our local birds go to Florida for the winter, and the chances are that the northern and southern races occur together in the South, traveling perhaps in separate flocks. On this point more information is needed. And until a series of birds that winter in Pennsylvania has been collected and studied, we cannot say with any certainty whether they are individuals come down from the North, or locally raised birds staying over for some reason.

Even in the case of such a well-known bird as the robin there thus remain problems to be solved.

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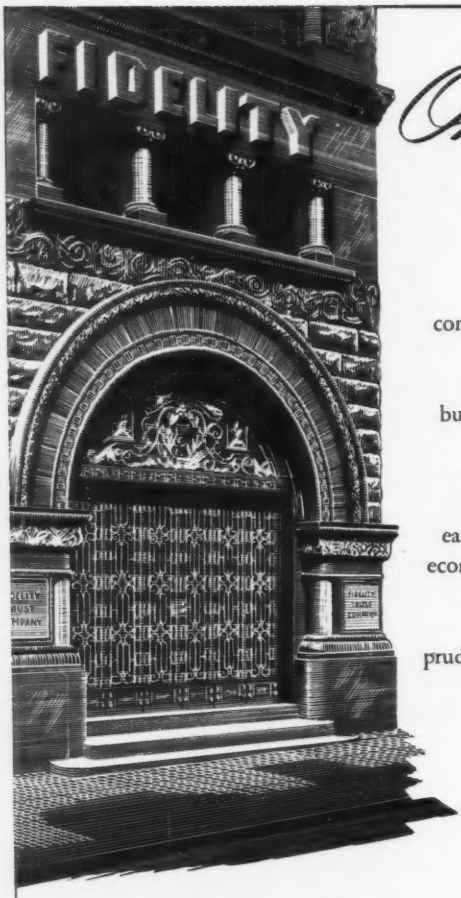

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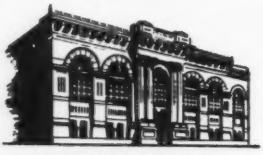

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THE PLAY'S THE THING

By Austin Wright

The production of *The Cherry Orchard* in December made the second occasion on which the department of drama at Carnegie Tech had staged Anton Chekhov's masterpiece within fifteen years. That fact and the fact that *The Three Sisters* was likewise staged twice within that span indicate not only a continuing admiration for the great Russian within the department, but also—and this is probably the more significant motive—a realization of the challenging and maturing experience which the performance of a Chekhovian work gives to student players. There are almost no other dramas which require so much art in the performance and are so rewarding to the earnest actor; the question of their appeal to a mid-twentieth-century audience is another matter.

STUDY IN FRUSTRATION

Like most Russian dramas, and like Chekhov's own matchless short stories, *The Cherry Orchard* is almost without plot; in it character is everything, and emotion may be said to replace action. The audience sees a number of persons—many of them weak and trivial, but all unforgettable—wander in and out, converse with the casualness and inconsequence and very occasional brilliance of real life, and drift in spiritual isolation toward disaster. All of Chekhov's plays are a study in frustration, and *The Cherry Orchard* (1904) is perhaps his most successful presentation of the decay of the aristocratic class which was to tumble into extinction in 1917. Chekhov cherished a wistful fondness for the lovable and humane society which he pictures, but he was poignantly aware that its good intentions were being "broken into dust" against its "improvidence, indolence, and fantastic triviality." *The Cherry Orchard* is the death knell of a gracious but doomed way of life.

In undertaking the direction of thirty young people in a production of this moving but difficult play, Lawrence Carra faced an arduous task which he carried out with patience and skill. The settings designed by Louis Knaak were first-rate, and the lovely scene in "the open country" provided a subtle accompaniment for the somber yet peaceful tone of the second act. Chekhov is a master of the use of sound to enhance beauty or pathos; and the dreamily mournful music of Yepikhodov, the click of billiard balls, the ominous bite of axe against wood, the clatter of hooves and carriage wheels, and the symbolic "sound of a breaking harpstring" were admirably handled. The party scene in the characteristic Russian double drawing-room, with much of the action taking place in the inner room, was highly realistic, though I have seen more successful performances of Charlotta's parlor magic. The costuming throughout was impeccable, and the growing light during the early-morning arrival of the returned travelers and the stealing dusk of the outdoor scene were sensitively suggested.

THESE DISPOSSESSED GENTLEFOLK

The dispossessed gentlefolk were played in a way to emphasize the tragedy of their plight, with proper emphasis also upon their fecklessness but almost none upon their absurdity. This seems to me the correct tone, though a modern Russian production would no doubt stress the degrading Parisian liaison of Liubov and the ridiculous qualities of both Gaiev and his sister. The emotion which overwhelms the volatile Liubov upon her entrance into the old nursery, the anguish which descends upon her—momentarily, it is true—when the abrupt appearance of her little dead son's tutor reminds her of the child's drowning, and the cold heartbreak of the aging brother and sister as they look for the last time upon the blossoming orchard—all were feelingly portrayed. The first Gaiev in particular looked every inch the

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Austin Wright has been head of the English department at Carnegie Institute of Technology for the past two years. A graduate of Haverford College and with the degree of Doctor of Philosophy from Harvard, he joined the Tech faculty in 1927. Dr. Wright brings to his reviews of the student-produced plays in the Little Theatre a background of wide acquaintance in literature.

SCENE FROM "THE CHERRY ORCHARD" AT CARNEGIE TECH LITTLE THEATRE

aristocrat, and in both casts the half-pathetic, half-absurd contrast between Gaiev's hauteur and his hopeless incompetence was well carried out.

The two love affairs, if they can be called that, which wander through the play present a sharp contrast. On the one hand is the idealistic adoration of the perpetual student, Trofimov, for the innocent and dreamy Anya, and on the other is the strange tie between the inarticulate, irresolute Lopakhin and poor Varya. Both affairs are doomed from the start, though the sentimentalist may comfort himself by thinking as the curtain falls that sometime, somehow, the sky will brighten for the younger pair. Anya has little to do but receive affection from all sides, but Trofimov represents the inquiring mind, the fondness for speculation, and the idealism which Chekhov perceives in the Russian character. Varya is the only practical member of the aristocratic family, and the only one perhaps for whom even a cynic would feel sorry. The first Trofimov conveyed with especial skill the contrast between the student's bold idealism and his practical weakness, and the first Lopakhin seemed more the rough self-made man, the peasant turned landowner, than did the more suave and cultured Lopakhin of the second cast.

The hearty, emotional, slow-thinking Pischik seems to me in retrospect the most successfully portrayed character among the lesser personages, though that young scamp Yasha was played so effectively as a brash and vulgar puppy that one wanted to take a stick to him. Charlotta's speech in the outdoor scene when she surveys with rueful humor her own friendless state was made memorable, but in the rest of the play Charlotta remained something of a puzzle—as indeed she is to the reader. One of the Yepikhodovs gave to the amusing role a hurt dignity that was pathetic as well as comic. Dunyasha was appropriately flighty, and the young actors who played the aged Firce were the incarnation of decrepit fidelity.

MEANING FOR ALL

Entirely aside from its picture of a decaying class, *The Cherry Orchard* has meaning for thoughtful playgoers. It is filled with subtle touches, mostly rather melancholy, which bring the audience into sudden kinship with the characters: Gaiev, for instance. He is a selfish weakling, but one sympathizes with him when he interrupts the eager Trofimov's hymn to progress with his quiet "One must die in any case." And the pathos of life could hardly be better expressed in an impassioned lyric than in his puzzled remark to his sister as they view the old nursery, "Why, once, Sister, we used to sleep together in this very room, and now I'm fifty-one, strange as it seems."

TECH LITTLE THEATRE

"619. Portrait of a Polish Family"
February 26 through March 7, 8:15 P.M.
Matinee, March 4, 3:30 P.M.

The first performance of a new play written by Lloyd Weninger, assistant professor of drama at Carnegie Tech. The Little Theatre doors are thrown open to the public at 8:15 P.M.

THE SCIENTIST'S BOOKSHELF

By M. Graham Netting

ANIMAL FACTS AND FALLACIES By Osmond P. Breland. New York: Harper and Brothers. 268 p. $3.00. Carnegie Library call no. r 591.5 B 72.

According to Professor Breland, "There has long been a demand for a nontechnical book concerning animals which considers such questions as these: Can toads live for years in solid rock? What is the largest animal that ever lived? Can the horned toad squirt blood from its eyes? Will sharks attack human beings? Are lizards poisonous? What is the largest fish? Could a whale have swallowed Jonah? What is the difference between crocodiles and alligators?"

To this opening paragraph of *Animal Facts and Fallacies* I can subscribe fully. In twenty-six years behind museum walls I think that I have been asked at least once each of the several hundred questions about mammals, birds, fishes, amphibians, and reptiles answered in this book, and some of the questions I have heard hundreds of times. Certainly my answers, on many occasions, have fallen far short of providing the inquirers with as much fascinating information as the present volume affords.

People are tremendously curious about the size, longevity, physical prowess, habits, and idiosyncrasies of animals. In retrospect, it is astonishing that some biologist did not render a service to his question-harassed contemporaries as well as to the inquiring public by preparing a book of this type long ago. Perhaps the reason lies in the years of laborious fact-gathering which preceded the actual writing of this book. Only those who have spent days stalking elusive facts through book-crammed library stacks can fully appreciate how difficult it is to answer many simple biological questions adequately. And many can't be answered at all because our knowledge of the animals concerned is still too scanty.

CONCEIVED BY A SKEPTIC

It is fortunate that this book was conceived and executed by a zoologist imbued with a proper amount of scientific skepticism; I shudder to think how many myths might have been revivified and how many fallacies perpetuated if the same questions had been answered by a romancing, uncritical writer. Breland has drawn most of his data from authoritative sources but he has not overlooked various early accounts and classic stories which are at variance with later evidence; he frequently alludes to such—as the claims for centenarians among birds—but he warns that these are suspect until supported by incontrovertible evidence.

In reading these familiar questions—What mammal has a poisonous bite? How do porcupines mate? Can fish freeze and still live? Does the giraffe have a voice? Can snakes bite under water? How far can frogs jump?—I found myself nodding agreement as the answers unfolded. In some few instances I am a shade more skeptical than Breland, which is not surprising, because no two scientists are ever in complete agreement on so many varied matters. For example, my friend Jim Chapin and I yearn to test the ancient tale that crocodile birds act as dental hygienists within the gaping jaws of crocodiles as soon as we can find a zoo that values experimentation more highly than a few Egyptian plovers. In a very few cases I am a whit less skeptical than the author. Having seen a freshly skinned and cleaned rattlesnake carcass slither out of a deep pan while being rinsed, I can credit an eel with post-mortem ability to squirm out of a covered frying pan until the lid was tied down.

OF AGE, SIZE, SPEED

I don't believe that any flatterer ever said, "You don't look that old" to an

elephant, for most people harbor the misconception that elephants are the ancients among mammals—a record actually held by our species. Few elephants indeed are known to have exceeded our alloted span of three score years and ten. As a student of turtles, the longest lived of any backboned animals, I accord little veneration to any animals that can't join the half-century club, and few mammals can. I make an exception of Prickly Pete, the spiny anteater that has resided at the Philadelphia Zoo for over forty years, because so far as I know, his disposition has remained unruffled throughout.

The tiniest backboned animal is a Philippine fresh-water fish of the goby group which matures at a length of slightly more than a quarter of an inch. The largest fish, the whale shark, known to reach forty-five feet in length, has a throat only about four inches in diameter. The sulphur bottom or blue whale, with a record length of one hundred and eight feet, although believed to be the largest animal that has ever lived, could not have swallowed Jonah either. A smaller cousin, the toothed sperm whale, although it attains only a paltry sixty-odd feet could have done so, for Breland recounts two instances of men having been swallowed by this species. One victim, recovered after a night within the whale, actually survived the ordeal if the contemporary account is to be believed.

Everyone knows that the giraffe is the tallest living mammal, but few persons would be prepared to say what height it attains. Professor Breland gives eighteen feet eleven and one-half inches as the maximum recorded height, but states that a few individuals may reach twenty feet. An extinct rhinoceros, which once inhabited Mongolia, was the giant among mammals, however, measuring seventeen feet nine inches at the shoulder and possibly twenty-five feet from the soles of its front feet to the crown of its head.

"What is the fastest mammal in the world?" Breland awards the blue ribbon for short heats to the cheetah, which has been timed at seventy miles per hour. However, for the mile and over, the blackbuck of India, the Mongolian gazelle, and the American pronghorn might be rather evenly matched with known speeds of at least sixty miles per hour. Gazelles, the lion, and possibly deer can outdistance the fastest race horses, which do not exceed fifty miles per hour. Jack rabbits, coyotes, bison, grizzly bears, rhinos, and elephants are all faster than the fleetest human sprinter, for the highest average speed attained in the 220-yard dash is only slightly in excess of twenty-two miles per hour.

Hummingbirds, as might be expected, lay the smallest eggs of any birds. The vervain hummingbirds of Haiti and Jamaica have eggs only one-quarter of an inch long. The seven-inch-long ostrich egg, although it is the largest laid by any bird today, is tiny in comparison to the egg laid by the extinct elephant bird, or roc, of Madagascar, which had a cubic capacity of over two gallons and was thus equivalent to six ostrich eggs or one hundred and fifty hen's eggs.

EASY REFERENCE

The book contains an excellent index and a bibliography of the more important book-length references consulted. There is inherent evidence that Professor Breland reviewed much of the technical literature of vertebrate zoology. I should like to suggest to him and to his publisher when a second edition of this book is required, as it surely will be, that the most important reference on the subject be appended at the end of each answer for the benefit of inquisitive readers. The author's answers, although adequate for most readers, may only whet the appetites of potential quiz kids, and teachers would find direct references to source material invaluable. Even laymen, I have discovered, find scientific papers quite readable when a wager is at stake.

In these days there are lists of "required reading" for nearly every activity from the cradle to the grave. *Animal Facts and Fallacies* should head the list of required reading for museum workers, biology teachers, and parents whose children are interested in nature, as most children are. If I had had this book at hand during the past several decades, I could easily have saved enough time to write a book myself.

M. Graham Netting last month became assistant director of the Carnegie Museum, where he has served as curator of herpetology since 1932.

STILL LIFE WITH VEGETABLES—Raphaelle Peale, American, 1774-1825—*Wadsworth Atheneum. Hartford*

FAMILIAR FOODS IN FAMOUS PAINTINGS

THE discovery of America focused attention on the fledgling science of natural history. Botanists accompanied explorers, classifying the unique flora in this land. Eager to supply the sudden demand for botanical folios, European publishers enlisted still life painters to prepare accurate illustrations. This new alliance between art and science created the botanic-decorative school reflected in the American work of the painting Peales.

▶ The father of this clan, Charles Wilson Peale, epitomized the Yankee tradition of resourcefulness and lively intellectual interests. A notable portraitist and science illustrator, he established a museum of natural history originating habitat groups, was a dentist, coach-maker, saddler, soldier, legislator, philosopher and gourmet.

▶ Born into this atmosphere of intellectual ferment was son Raphaelle, the first still life painter whose work is distinctively American in its spirit of inquiry, its forthright simplicity, its rugged realism. Forced by illness to concentrate on one idiom, Peale developed an economical technique, an architectural strength, an abstract style that transcended the merely decorative-accurate work of his contemporaries.

▶ The bold cubistic pattern of light and shadow, the scientific interest in the distorting effect of refracted light on the carrots up-ended in the water glass, the absorption with the convolutions of the tomato make this unassuming, yet singularly mature little canvas an important forerunner of a vigorous American school to come.

▶ A precursor of today's good dining is the primitive tomato pictured here. It was a lop-sided, crease-cheeked little thing like this until modern horticulturists enhanced its appearance and stabilized its strains. The "Aristocrat" tomato, which today lends its crimson goodness to Heinz Chili Sauce and Ketchup, typifies an American tradition of experiment and striving for perfection. —Heinz School Service Library

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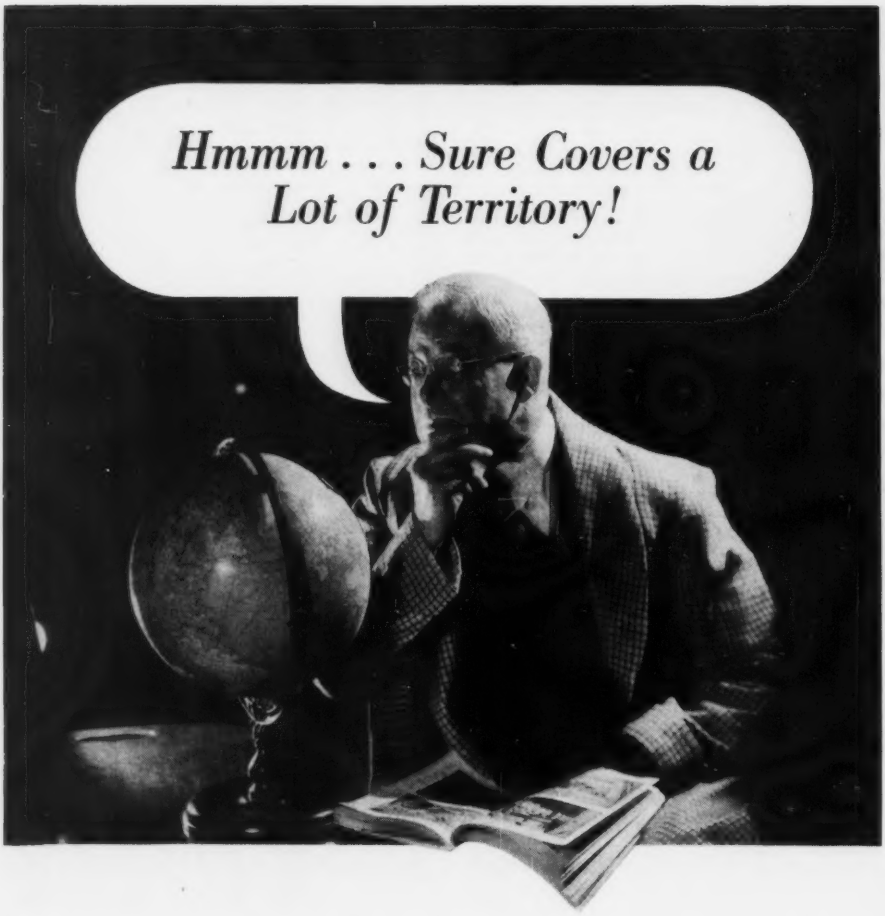

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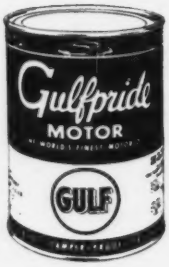

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